

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A price optimization system configured to create a promotional event calendar, useful in association with at least one store, the price optimization system comprising:
  - an econometric engine configured to model sales as a function of price to create a sales model, wherein the econometric engine includes an imputed variable generator for imputing base price variable and promotional variable, and wherein the sales model includes the imputed base price variable and the promotional variable;
  - a financial model engine configured to model costs to create a cost model;
  - a promotional engine coupled to the econometric engine, and financial model engine configured to receive input from the econometric engine and financial model engine, wherein the promotional engine analyzes a plurality of offers, a plurality of promotional events, conditions from at least one manufacturer, and constraints from the at least one store to optimally match offers with promotional events to create a promotional event calendar subject to the conditions from the at least one store, and wherein the constraints from the at least one store includes a linear constraint and a nonlinear constraint.
2. (Currently Amended) The system configured to temporary price reduction prices after the promotional events and offers have been selected.

3. (Currently Amended) The [[apparatus]] system, as recited in claim 2, further comprising a support tool connected to the promotional engine wherein the support tool [[receives]] is configured to receive the promotional event calendar from the promotional engine and provides a user interface to a client, wherein the user interface provides the promotional event calendar to the client.

4. (Currently Amended) The [[apparatus]] system, as recited in claim 1, wherein the promotional engine calculates the value of offers and the value of promotional events by using the financial model and sales model and selects combinations of the offers and the promotional events.

5. (Previously Presented) A computer-implemented method for creating a promotional event calendar, comprising:

- creating a sales model and wherein the sales model includes an imputed base price variable and a promotional variable;
- creating a cost model;
- determining conditions from at least one manufacturer;
- determining constraints from at least one store, and wherein the constraints from the at least one store includes a linear constraint and a nonlinear constraint;
- determining the value of offers using the sales model and cost model;
- determining the value of promotional events using the sales model and cost model; and
- selecting combinations of the offers and promotional events based on the determined values to create a promotion event calendar subject to the conditions from the at least one manufacturer and constraints from the at least one store.

6. (Previously Presented) The computer-implemented method, as recited in claim 5, wherein the creating of the sales model comprises:

- creating a plurality of demand groups, wherein each demand group is a set of at least one product and wherein at least one of the demand groups is a set of at least two substitutable products, and wherein the creation of the plurality of demand groups includes error detection and correction based on attributes of the plurality of demand groups;

creating a sales model for each demand group; and  
creating a market share model for each product in each demand group.

7. (Previously Presented) The computer-implemented method, as recited in claim 6, further comprising the step of estimating net profit from the selected combination of offers and promotional events using the sales model and cost model.

8. (Previously Presented) A computer-implemented method for creating a promotional event calendar, comprising:

creating a sales model, comprising:

creating a plurality of demand groups, wherein each demand group is a set of at least one product and wherein at least one of the demand groups is a set of at least two products;

creating a sales model for each demand group and wherein the sales model for each demand group includes an imputed base price variable and a promotional variable; and

creating a market share model for each product in each demand group;

creating a cost model;

determining conditions from at least one manufacturer;

determining constraints from at least one store, and wherein the constraints from the at least one store includes a linear constraint and a nonlinear constraint;

determining the value of offers using the sales model and cost model;

determining the value of promotional events using the sales model and cost model;

selecting combinations of offers and promotional events based on the determined values to create a promotion event calendar subject to the conditions from the at least one manufacturer and constraints from the at least one store; and

estimating net profit from the selected combination of offers and promotional events using the sales model and cost model.

9. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the constraints from the at least one store include at least one of ad space capacity and display space capacity.

10. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the constraints from the at least one store include at least one of an event type, a number of events, a brand promotion frequency, and a product promotion frequency.

11. (Previously Presented) The computer-implemented method as recited in claim 5, wherein the constraints from the at least one store include at least one of ad space capacity and display space capacity.

12. (Previously Presented) The computer-implemented method as recited in claim 5, wherein the constraints from the at least one store include at least one of an event type, a number of events, a brand promotion frequency, and a product promotion frequency.

13. (Previously Presented) The computer-implemented method as recited in claim 8, wherein the constraints from the at least one store include at least one of ad space capacity and display space capacity.

14. (Previously Presented) The computer-implemented method as recited in claim 8, wherein the constraints from the at least one store include at least one of an event type, a number of events, a brand promotion frequency, and a product promotion frequency.

15. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the matching of offers with promotional events includes solving an integer problem using the linear constraint and the nonlinear constraint.

16. (Previously Presented) The computer-implemented method as recited in claim 5, wherein the selection of combinations of offers and promotional events includes solving an integer problem using the linear constraint and the nonlinear constraint.

17. (Previously Presented) The computer-implemented method as recited in claim 8, wherein the selection of combinations of offers and promotional events includes solving an integer problem using the linear constraint and the nonlinear constraint.
18. (Cancelled)
19. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the conditions from the at least one manufacturer include providing at least one of a promotional event and a specific amount of promotion.
20. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the conditions from the at least one manufacturer include not providing a promotional event for a competitor's product.
21. (Previously Presented) The computer-implemented method as recited in claim 5, wherein the conditions from the at least one manufacturer include providing at least one of a promotional event and a specific amount of promotion.
22. (Previously Presented) The computer-implemented method as recited in claim 5, wherein the conditions from the at least one manufacturer include not providing a promotional event for a competitor's product.
23. (Previously Presented) The computer-implemented method as recited in claim 8, wherein the conditions from the at least one manufacturer include providing at least one of a promotional event and a specific amount of promotion.
24. (Previously Presented) The computer-implemented method as recited in claim 8, wherein the conditions from the at least one manufacturer include not providing a promotional event for a competitor's product.

25. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the imputed base price variable is a function of initial base prices.

26. (Currently Amended) The [[apparatus]]system as recited in claim 25, wherein the initial base prices are averages of non-promoted prices.

27. (Currently Amended) The [[apparatus]] system as recited in claim 1, wherein the sales model created by the econometric engine includes Bayesian Shrinkage modeling.

28. (New) A computer-implemented method for creating a promotional event calendar, useful in association with at least one store, the computer-implemented method comprising:

- modeling sales as a function of price to create a sales model, wherein the sales model includes imputing base price variable and promotional variable;
- modeling costs to create a cost model;
- receiving cost model and sales model;
- analyzing a plurality of offers, a plurality of promotional events, conditions from at least one manufacturer, and constraints from the at least one store; and
- creating a promotional event calendar by optimally matching offers with promotional events.

29. (New) The computer-implemented method, as recited in claim 28, wherein creating the promotional event calendar is subject to the conditions from the at least one store, and wherein the constraints from the at least one store includes a linear constraint and a nonlinear constraint.

30. (New) The computer-implemented method, as recited in claim 29, wherein creating the promotional event calendar comprises:

- computing a score for each offer of the plurality of offers and each event of the plurality of promotional events, wherein each event include at least one type of promotional vehicle, and wherein each offer includes at least one promotional vehicle requirement;

selecting a combination of offers from the plurality of offers, and events from the plurality of promotional events to form a subset of offers and events;

reconciling the type of promotional vehicle with the promotional vehicle requirements for the offers and events within the subset of offers and events; and

constructing a promotion calendar utilizing the subset of offers and events, and reconciled type of promotional vehicle and promotional vehicle requirements.

31. (New) The computer-implemented method, as recited in claim 30, wherein the computing the score independently computes a value of each offer and a value of each event, and wherein the computing the score also links each product with one promotional vehicle type of the at least one promotional vehicle type.

32. (New) The computer-implemented method, as recited in claim 30, wherein selecting the combination of offers and events includes maximizing the sum of the values of the offers and events within the subset of offers and events, while adhering to the conditions from at least one manufacturer and the constraints from the at least one store.

33. (New) The computer-implemented method, as recited in claim 30, wherein reconciling the type of promotional vehicle with the promotional vehicle requirements includes solving an integer problem.

34. (New) The computer-implemented method, as recited in claim 30, wherein constructing a promotion calendar includes setting the promotion levels of each product and computing the resulting profit over a promotional period.

35. (New) The computer-implemented method, as recited in claim 30, wherein the selection subset of offers and events includes the integer programming model with the following objective and appropriate restrictions on the variables:

$$\sum_{t=1}^T \sum_o Value_o IO_{o,t} + \sum_{t=1}^T \sum_e Value_e IE_{e,t}$$

where,

$t$ : a time indices;

$O$ : a set of offers;

$o$ : an offer in  $O$ ;

$E$ : a set of events;

$e$ : an event in  $E$ ;

$T$ : total planning period in weeks;

$IE_{e,t} \equiv \begin{cases} 1 & \text{if event } e \text{ is scheduled to start in period } t \\ 0 & \text{otherwise} \end{cases}$ ; and

$IO_{o,t} \equiv \begin{cases} 1 & \text{if offer } o \text{ is accepted in period } t \\ 0 & \text{otherwise} \end{cases}$ .

36. (New) The computer-implemented method, as recited in claim 30, wherein the reconciliation includes the integer programming model with the following objective and appropriate restrictions on the variables:

$$\text{Maximize: } \sum_{t=1}^T \left( \sum_{\substack{p,e: IE_{e,t}=1 \\ k \in \text{DisplayLag}(e)}} Score_p IDE_{p,e,t+k} + \sum_{\substack{p,e: IE_{e,t}=1 \\ k \in \text{AdLag}(e)}} Score_p IAE_{p,e,t+k} \right)$$

where,

$t$ : time indices;

$E$ : set of events;

$e$ : event in  $E$ ;

$p$ : index for products belonging to a set of promoted products;

$\text{DisplayLag}(e) \equiv \left\{ \begin{array}{l} \text{the offsets from the start of the event during} \\ \text{which the products have to be on display} \end{array} \right\}$ ;



$$AdLag(e) \equiv \left\{ \begin{array}{l} \text{the offsets from the start of the event during} \\ \text{which the products have to be advertised.} \end{array} \right\};$$

$T$  : total planning period in weeks;

$$IE_{e,t} \equiv \left\{ \begin{array}{l} 1 \text{ if event } e \text{ is scheduled to start in period } t \\ 0 \text{ otherwise} \end{array} \right.;$$

$$IDE_{p,e,r} \equiv \left\{ \begin{array}{l} 1 \text{ if product } p \text{ is on display in event } e \text{ in period } r \\ 0 \text{ otherwise} \end{array} \right.;$$

$$IAE_{p,e,r} \equiv \left\{ \begin{array}{l} 1 \text{ if product } p \text{ is advertised in event } e \text{ in time } r \\ 0 \text{ otherwise} \end{array} \right.;$$
 and

$r$ : any period in the promotion interval.